

Work Order ID 86842

86842

Page 1

July-06-12 3:10:33 PM

Item ID: D212-664-101

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Fwd

Start Date: 7/06/12 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 8/10/12 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Run Start ***NR1***

Approvals: Process Plan: Date: 12-07-9 Tooling: Date:

Stop ***NR2***

QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D212-664-141	Rev D (DEO)

100	DOCUMENT CONTROL	0.00							
100									
DC	Memo	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D212-664-101								

110	Pick Kit	0.00							
110	Packaging								
Packaging	Memo	0.00							
Packaging									

120	BENDING MACHINE - CROSSTUBES	0.00							
120									
CNC Bend 2	Memo	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101								

DAS 16

12/4/30

MO 12-7-23

DP 12-7-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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130

QC15- Crosstube Dimensional Check

0.00

130

QC

Memo

0.00

Quality Control

DAS 16 9-83 12/13/24

140

Crosstubes

0.00

140

Crosstubes

Memo

0.00

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549, using drill table DT8577, set-up towers in hole #7 as per QSI 10

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

MO Bm

12-4-24

MO

12-7-25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	QC5- Inspect part completeness to step on W/O	0.00							
150									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
160		0.00							
160									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- CLEAN CROSSTUBE WITH WASH'N WIPE								
170	Outsource process - NDT per QSI038 4.1	0.00							
170									
Outsource2	Memo	0.00							
Outsource process - NDT	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Liquid Penetrant Inspection as per QSI 038								
	Issue P/O: 17554								
	LPI as per ASTM 1417 Level 2								
	Attach copy of NDT results to work order								

DAS
16
9-89 17/07/12

1 12 07 27

12-07-27

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

Work Order ID 86842***86842***

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

180

180

Packaging

Packaging

Receive & Inspect for Damage & Mat'l Certs
Packaging

Memo

Ensure copy of NDT results attached to work order.

0.00

0.00

190

190

QC

Quality Control

QC5- Inspect part completeness to step on W/O

Memo

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

Inspect for damage & ensure results are as per Dwg D212-664-141

0.00

0.00

193

193

HandFXtube

Hand Finishing Crosstubes

Crosstubes Chemical Conversion

Memo

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN
CROSSTUBE BEFORE CHEMICAL CONVERSION

0.00

0.00

W/O:		WORK ORDER CHANGES					
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Cust Item ID:

Required Date: 8/10/12 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
195	QC7-Inspect Chemical Conversion Coat	0.00							
195									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
200	Spray Painting per QSI005 4.2	0.00							
200	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube as per DEO D212-667-141 with White Imron as per QSI 005 4.2								
	PRIME: 121334								
	Start Time: 8:30								
	Finish Time: 9:15								
	PAINT: 122381								
	Start Time: 4:15								
	Finish Time: 5:00								

1 _____ 12 07 28

12-7-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Item ID: D212-664-101 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Fwd
 Start Date: 7/06/12 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 8/10/12 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210 *210* QC Quality Control	QC14- Inspect Spray Paint Memo Then, Wrap in plastic bag to protect from scratches	0.00 0.00							
220 *220* Crosstubes Crosstubes	Crosstubes Memo 1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe 2-Install supports with Proseal 890 per DSI9563 and QSI 015 A/R Proseal 890 Batch: <u>122441</u> 3- Torque bolts as per dwg	0.00 0.00							
230 *230* QC Quality Control	QC6- Inspect dimensions to drawing Memo	0.00 0.00							

DAV
IC
S.C. 12/4/30

AB 12-7-29

DAV
IC
S.C. 12/07/30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Picklist Print

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Page 1

Work Order ID: 86842
Parent Item: D212-664-101
Parent Item Name: Crosstube Fwd

Start Date: 7/06/12
Start Qty: 1.00

Required Date: 8/10/12
Required Qty: 1.00

Comments: IPP Rev:E04.02.16ReformatKJ/DS
IPP Rev:F 06-03-29 Remove Coments on Pick List JLM
IPP Rev:G 07-04-30 As per Rev C JLM IPP Rev:H 11.04.26 inspection
strip ecn 11-549 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-101TRN Crosstube Turning Detail		Manufactured	No			110	Each	2.0000	1			12-07-23	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG	85829	2		B87878				12-7-23	
						1							
D3595-063-450 RUBBER CUSHION		Manufactured	No			230	Each	105.0895	4	4.2105263		12-7-29	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG		9.28							
					82511	9.28							
				LG051		85.7							
					80161	1.7							

Work Order ID 86842

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Item ID: D212-664-101
Revision ID:
Item Name: Crosstube Fwd

Accept

N900040100

Setup Start *NS1*
Stop *NS2*

Start Date: 7/06/12 Start Qty: 1.00 *1*
Required Date: 8/10/12 Req'd Qty: 1.00 *1*

Cust Item ID:
Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*
Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Pick Kit	0.00							
240	Packaging								
Packaging	Memo	0.00							12/7/30 SP
250	QC4- 100% Inspect kits for completeness	0.00							
250	QC								
Quality Control	Memo	0.00							
260	Packaging	0.00							
260	Packaging								
Packaging	Memo	0.00							
	Identify and pack for shipping as per PPP D212-664-101								SHIP

12/7/30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

H:\FORMS\Quality Assurance\approved QAINCRWO RevE

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Picklist Print

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Page 2

Work Order ID: 86842
Parent Item: D212-664-101
Parent Item Name: Crosstube Fwd

Start Date: 7/06/12

Required Date: 8/10/12

Start Qty: 1.00

Required Qty: 1.00

MS21920-25
Clamp(per MIL-DTL-8783C)

Purchased No

220 Each 136.0000

4

4

Al 12-7-29

Location Loc Qty Loc Code

LG050 117
116264 2
117998 4
118142 4
119339 2
119746 2
120475 7
120920 46
122204 50
LG051 19
121583 19

D2893-1
2.75 Support

Manufactured No

220 Each 16.0000

2

2

Al 12-7-29

Location Loc Qty Loc Code

LG 9
83056 9
LG052 7
72865 2
80271 4
82228 1

D3428-1
Placard

Manufactured No

240 Each 33.0000

1

12/7/30 SP

Location Loc Qty Loc Code

ST042 33
78933 2
81881 9
83582 10
85228 12

Shop Packet Print

July-06-12 3:10:33 PM

Page 2

11/86842

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Parent Item Name: Crosstube Fwd

Start Date: 7/06/12

Required Date: 8/10/12

Start Qty: 1.00

Required Qty: 1.00

AN6-35A Purchased No 240 Each 42.0000 4 4

BOLT

Location Loc Qty Loc Code

342 42

121181 42

AN6-36A Purchased No 240 Each 47.0000 4 4

Bolt

Location Loc Qty Loc Code

ST342 47

118422 2

119449 1

120187 4

120423 40

MS21042L6 Purchased No 240 Each 497.0000 6 6

Nut

Location Loc Qty Loc Code

ST300 497

117677 25

118384 3

118927 48

119075 221

120308 200

AN960JD616 NAS1149D0663J Purchased No 240 Each 0.0000 18 18

Washer

MIZI708
12/7/30

July-06-12 3:10:33 PM

Shop Packet Print

Page 3

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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Dart Aerospace Ltd

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Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.514±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION. SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS
- WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 86892

REMOVED FROM UNDER REVIEW 902
UNDER REVIEW EGNH 11-014
FOR PROCEEDING 5/1/02
2/10/02

DEO ATTACHED

RELEASED
2009-10-29

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. D
MFG. APPR.	10	D212-664-141	SHEET 1 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	10	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS UNDERSTANDING THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD	

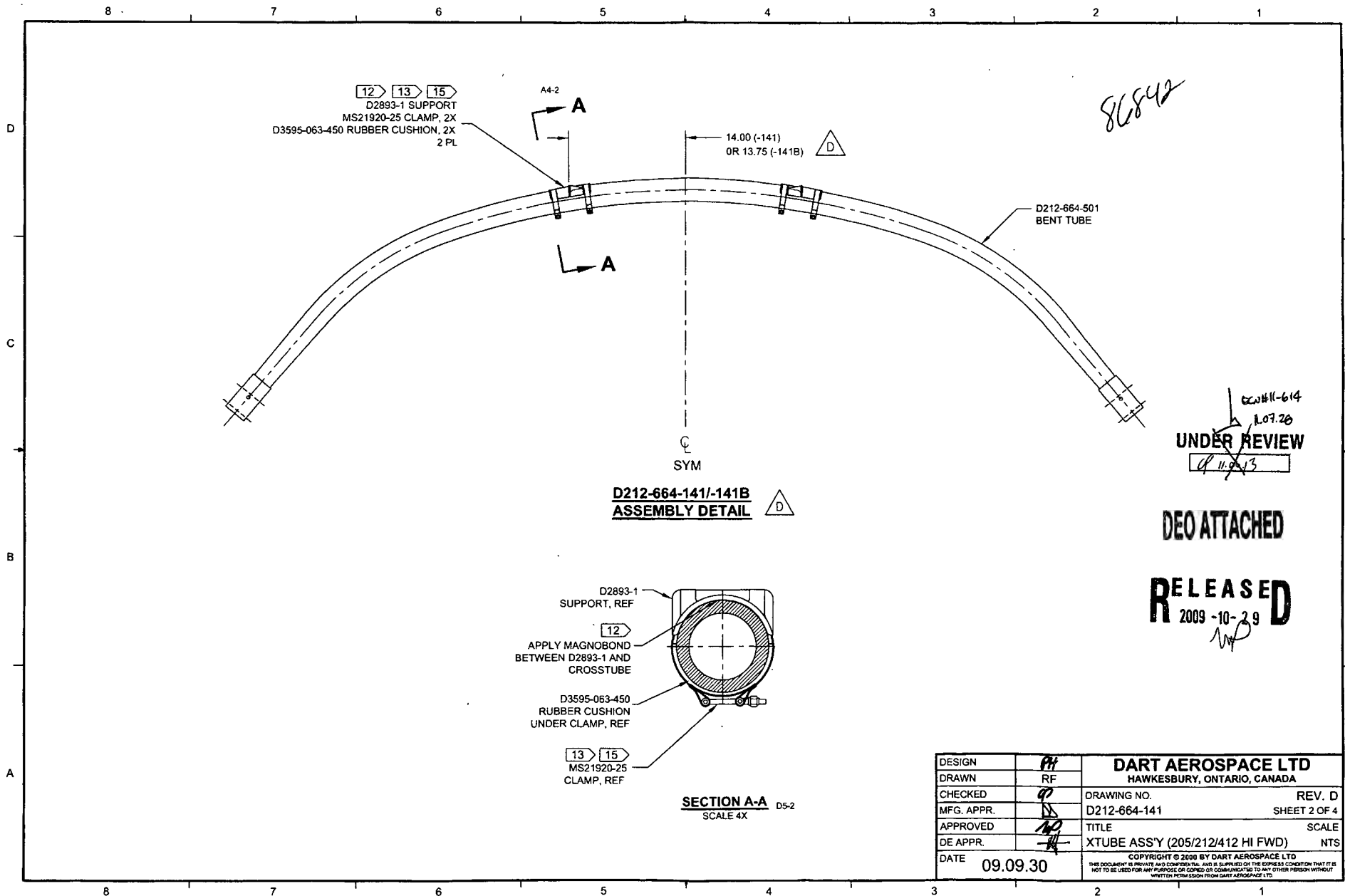
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



Dart Aerospace Ltd

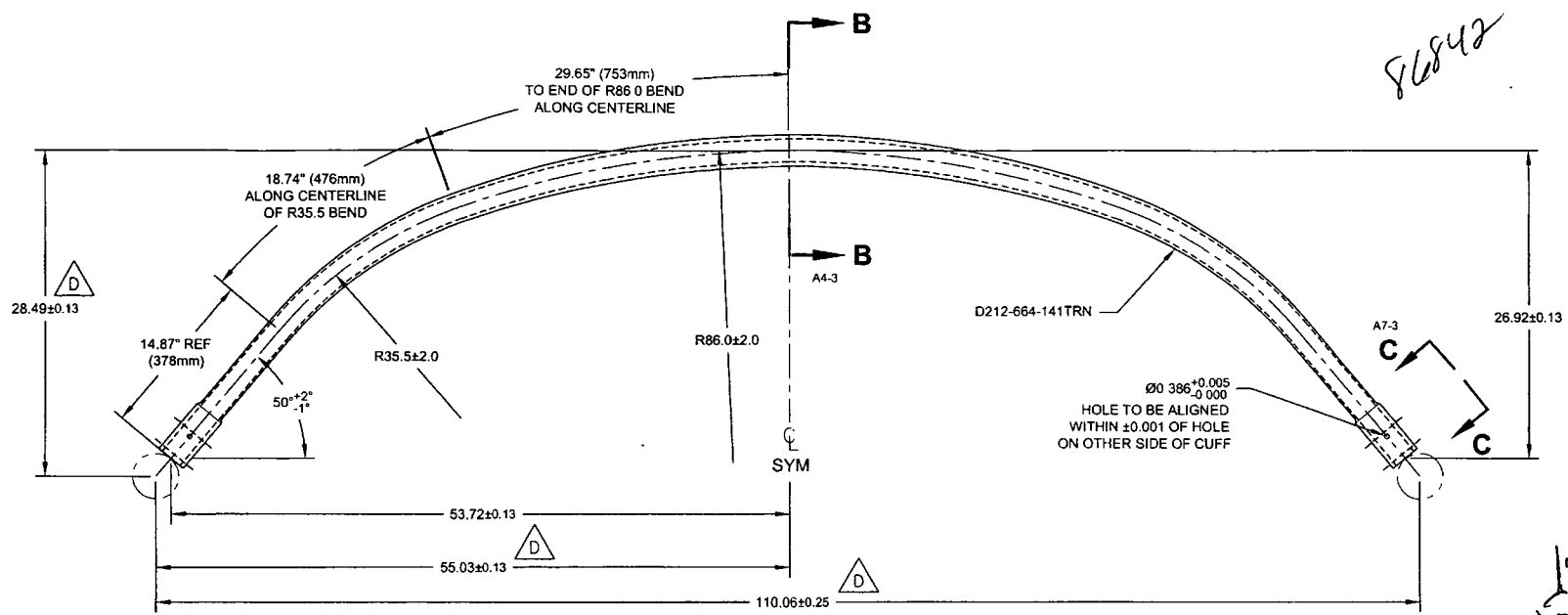
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

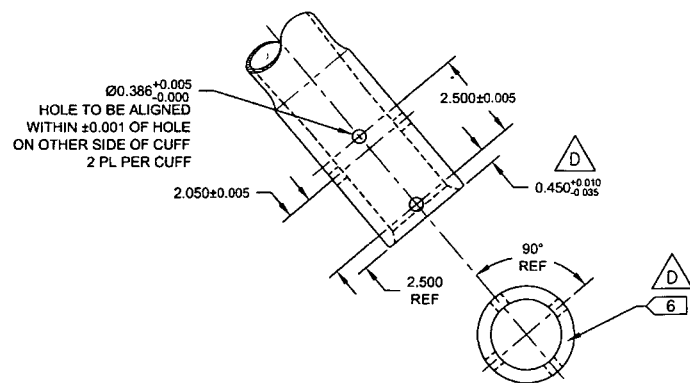


D212-664-501
BENDING AND DRILLING DETAIL

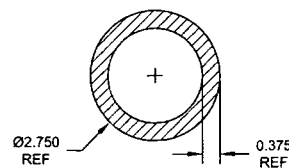
00111-664
11.09.20
UNDER REVIEW
11.09.23

DEO ATTACHED

RELEASED
2009-10-29
[Signature]



VIEW C-C: CUFF DETAIL
SCALE 3X



SECTION B-B
SCALE 4X

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. D
MFG. APPR.	18	D212-664-141	SHEET 3 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	11	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD	
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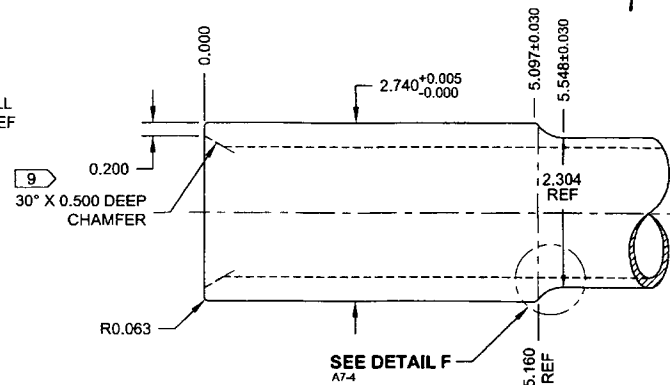
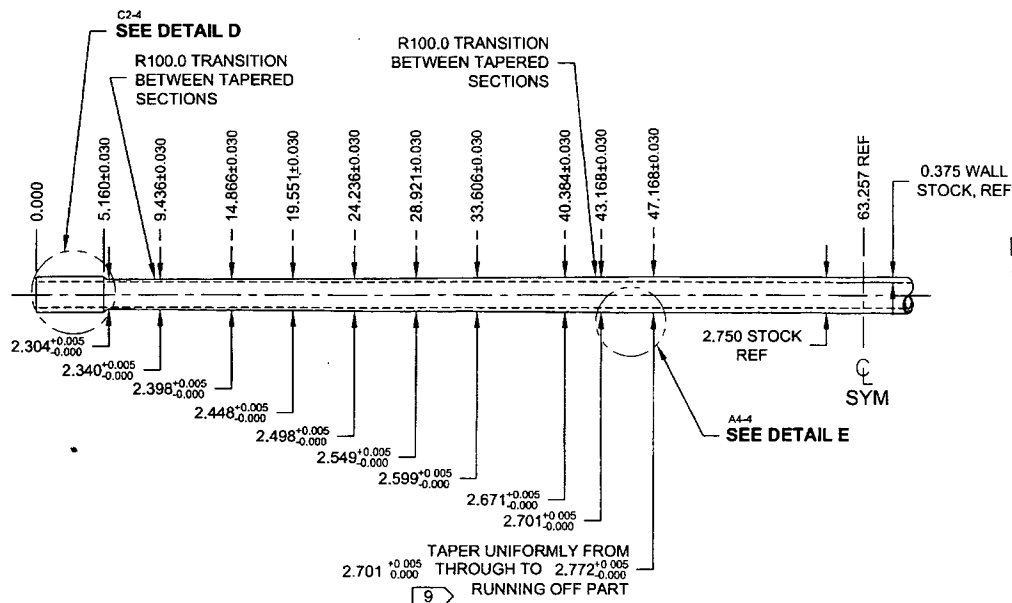
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

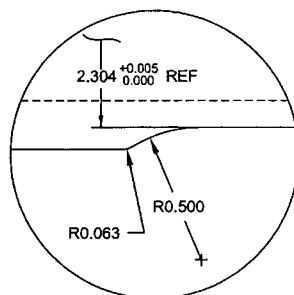
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

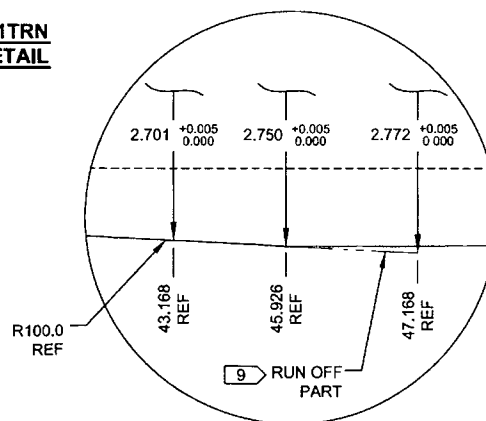
NOTE: Date & initial all entries



DETAIL D:
CROSSTUBE CUFF D8-4
SCALE 5X



DETAIL F:
CUFF TRANSITION C2-4
SCALE 10X



DETAIL E:
TAPER RUN-OFF C5-4
NOT TO SCALE

UNDER REVIEW
11.06.13

DEO ATTACHED

RELEASED
2009-10-29

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. D
MFG. APPR.	12	D212-664-141	SHEET 4 OF 4
APPROVED	12	TITLE	SCALE
DE APPR.	12	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	DATE	MFG. APPR.	APPROVED	DE APPR.		
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

PURPOSE:

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

CHANGE:

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

RELEASED
2011-04-18

UNDER REVIEW

14/06.13
12/05.11-614
12/11.07.28

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>UP</i>	MFG. APPR. <i>E</i>	APPROVED <i>WD</i>	DE APPR. <i>WD</i>		
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

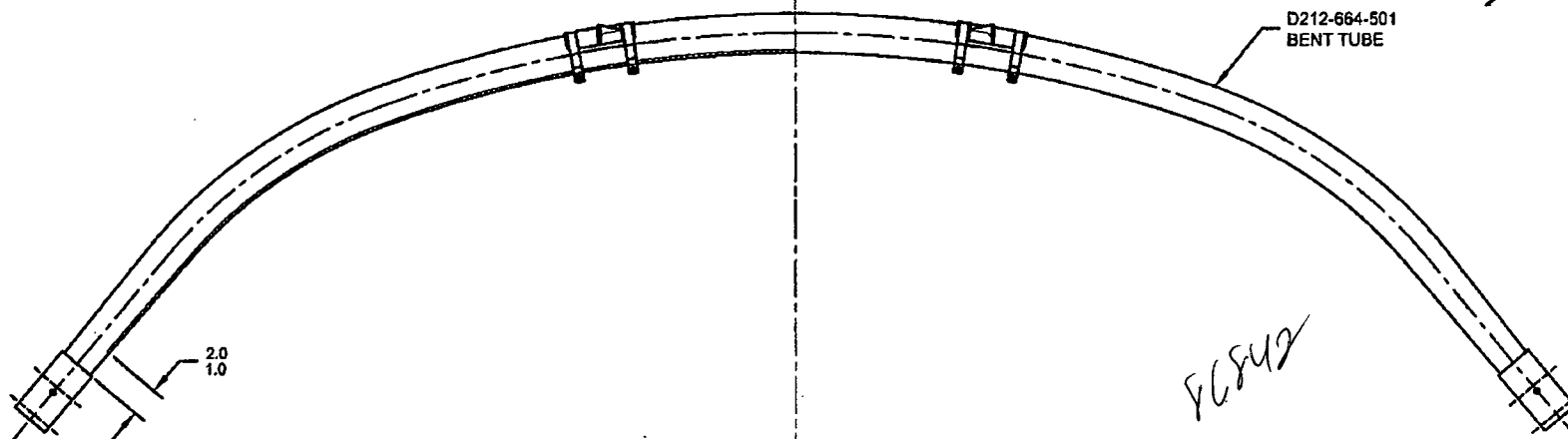
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WAS:

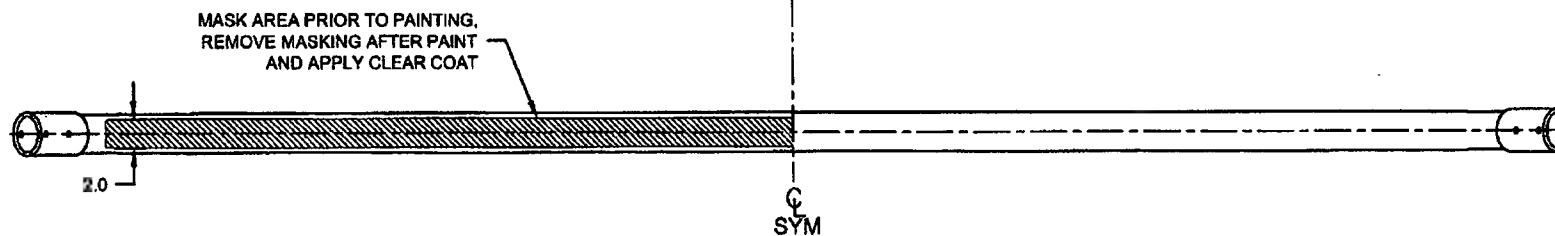
UNDER REVIEW

UP 11/06/13

*ECO# 11-614
11.07.28*



**D212-664-141/-141B
ASSEMBLY DETAIL**



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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DRAWING NO. D212-664-141	TITLE CROSSTUBE ASS'Y (205 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-141-D-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>UP</i>	CHECKED <i>AS</i>	MFG. APPR. <i>AB</i>	APPROVED <i>MP</i>		DE APPR. <i>TH</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

7	A/R	A/R	MAGNOBOND 8398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---------------------------------------------------------------------------------------------------------------

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28
MD

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 12677

CLIENT	<u>DAIT AeroSpace</u>	DATE	<u>July 27/12</u>	PAGE	<u>1</u>	OF	<u>1</u>
ATTENTION	<u>MAT / LINDA</u>	ACUREN JOB No.	<u>188-12-CO 293</u>	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	<u>1270 ABERDEEN ST.</u>	PO/VO No.	<u>17556 -</u>				
	<u>HAWKESBURY ON.</u>	WORK LOCATION	<u>SAME</u>				
PROJECT	<u>F.P.I. on CROSS TUBES</u>	ACCEPTANCE STD.	<u>ASTM 1417/OSI-038</u>	REV./DATE	<u>2005</u>		
ITEM(S) EXAMINED	<u>10 PCS</u>						

JOB DESCRIPTION	PROCEDURE No. <u>LT 002</u>	REV./DATE <u>2008</u>	TECHNIQUE No. <u>LT 002</u>	REV./DATE <u>2008</u>	
PART No.	<u>SEE RESULTS</u>	MATERIAL	<u>ALUMINUM</u>	THICKNESS	<u>VARIABLES</u>
SCOPE	<u>A WET FLOUORESCENT LIQUID PENETRANT EXAMINATION WAS DONE ON THE 100% OF SURFACE ONLY</u>				

TEST DETAILS	
METHOD <input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND <u>MAGNAFLUX</u>	BLACK LIGHT S/N <u>16455</u> <input type="checkbox"/> OUTPUT > 1000 μ W/cm ² <input type="checkbox"/> AMBIENT < 2 fc
PENETRANT <u>2-LG7</u> MINIMUM DWELL TIME <u>45</u> MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER <u>H2O</u> MINIMUM DRY TIME <u>>10</u> MIN.	OTHER <u>LABINO</u>
DEVELOPER <u>SKD 52</u> MINIMUM DWELL TIME <u>10</u> MIN.	LIGHT METER S/N <u>1098866</u> CAL DUE DATE <u>JUL 2012</u>
DEVELOPER TYPE <input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY	

TEST SURFACE	
SURFACE CONDITION <input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input type="checkbox"/> CLEAN BARE METAL	
SURFACE TEMPERATURE <input type="checkbox"/> < - 4°C/ 20°F <input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F <input type="checkbox"/> 10°C/50°F TO 52°C/125°F <input type="checkbox"/> > 52°C/125°F	

RESULTS- <input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL																																																			
<u>CROSSTUBE I.D.#</u>																																																			
<table><tr><td>1</td><td>"</td><td>"</td><td>87294</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>87296</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>87297</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>87293</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>86982</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>86842</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>86840</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>86983</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>86841</td><td>✓</td></tr><tr><td>1</td><td>"</td><td>"</td><td>83084</td><td>✓</td></tr></table>	1	"	"	87294	✓	1	"	"	87296	✓	1	"	"	87297	✓	1	"	"	87293	✓	1	"	"	86982	✓	1	"	"	86842	✓	1	"	"	86840	✓	1	"	"	86983	✓	1	"	"	86841	✓	1	"	"	83084	✓	<p>← REMIND ON THIS CROSSTUBE ONE TIME TO REMOVE INDICATION</p> <p><u>12 07 28</u></p>
1	"	"	87294	✓																																															
1	"	"	87296	✓																																															
1	"	"	87297	✓																																															
1	"	"	87293	✓																																															
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1	"	"	86983	✓																																															
1	"	"	86841	✓																																															
1	"	"	83084	✓																																															

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		DTR # <u>E-117397</u>
CLIENT REPRESENTATIVE <u>MAT MURPHY</u>	TECHNICIAN (SIGNATURE) <u>M. J. Joffe</u>	REPORT REVIEWED BY:
NAME (PRINT): <u>MAT MURPHY</u>	NAME (PRINT): <u>M. J. Joffe</u>	NAME INITIALS
CGSB LEVEL <u>IV</u> SNT LEVEL <u>II</u>	CGSB LEVEL <u>II</u> SNT LEVEL <u>II</u>	
CGSB REG. No. <u>C606</u>	CGSB REG. No. <u> </u>	

Work Order ID 86842

86842

Page 1

h-06-12 3:10:33 PM

Item ID: D212-664-101

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Fwd

Start Date: 7/06/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/10/12 Req'd Qty: 1.00

1

Customer:

Reference:

Run Start *NR1*

Approvals: Process Plan:

Date: 7-27-12 Tooling:

Date:

Stop *NR2*

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-141

Rev D (DEO)

100

100

DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D212-664-101 CHG005

0.00

0.00

110

110

Packaging

Packaging

Pick Kit

Packaging

Memo

0.00

0.00

120

120

CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101

0.00

0.00

MLJ 12 607 130

DP 12-7-23